

## Alejandro Roldán-Alzate

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Middleton, WI 53562  
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### Education

- Ph.D. Mechanical Engineering** (University of Wisconsin-Madison) 08/2008  
Advisor: Prof. Tim A. Osswald  
Dissertation: “Simulation of Physiological Flows”  
GPA: 3.65/4.00
- M.E. Polymer Engineering and Science** (University of Wisconsin-Madison) 05/2005  
Advisor: Prof. Tim A. Osswald  
GPA: 3.65/4.00
- B.S. Biomedical Engineering** (*Escuela de Ingeniería de Antioquia – Universidad CES - Medellín, Colombia*) 09/2002  
Thesis: “*Modelo Físico del Sistema Cardiovascular*” (Physical Model of the Cardiovascular System)  
GPA: 4.1/5.0

### Awards and Honors

- Summa Cum Laude Merit Award 2013  
“Quantification of Hepatic Blood Flow in Portal Hypertension Using 4D-Flow MRI: A Meal Challenge Study”, ISMRM 21st Annual Meeting
- Summa Cum Laude Merit Award 2013  
“Comprehensive Assessment of Diffuse Liver Disease with Quantitative MRI Biomarkers of Steatosis, Fibrosis and Portal Flow: A Biopsy Correlation Study”, ISMRM 21st Annual Meeting
- Summa Cum Laude Merit Award 2012  
“Noninvasive Estimation of Pulmonary Vascular Resistance with 4D Flow-Sensitive MRI in a Canine Model of Acute Pulmonary Arterial Hypertension”, ISMRM 20th Annual Meeting
- Summa Cum Laude Merit Award 2012  
“Complex and Magnitude MRI for Quantification of Hepatic Steatosis – Correlation with MR Spectroscopy and Biopsy”, ISMRM 20th Annual Meeting

- Lauterbur Award 2011  
Society of Computed Body Tomography and Magnetic Resonance
- Merck travel award 2010  
American Thoracic Society
- Travel Award 2009  
Pittsburg International Lung Conference
- Wang Distinguished Wisconsin Graduate Fellowship 2005 - 2007
- “Ramón Atalaya” Award 2003  
*XX Congreso Colombiano de Cardiología y Cirugía Cardiovascular* (XX Colombian Congress of Cardiology and Cardiovascular Surgery),  
Cartagena, Colombia
- “Luis de Greiff” Award 2003  
Best engineering undergraduate thesis: “*Modelo Físico del Sistema Cardiovascular* (Physical Model of the Cardiovascular System)”  
*Sociedad Antioqueña de Ingenieros y Arquitectos* (Antioquian Society of Engineers and Architects)
- Honored Undergraduate Thesis 2002  
“*Modelo Físico del Sistema Cardiovascular* (Physical Model of the Cardiovascular System)”, *Escuela de Ingeniería de Antioquia – Universidad CES*

## Grant Support

### Active

1. NIH R01 DK126850-01 09/2021 – 08/2024. (\$679,710)  
Non-Invasive Assessment of Bladder in Patients with Underactive Detrusor Muscle  
This project aims to study non-invasively evaluate the interaction of bladder and prostate during voiding using MRI.  
PI: Alejandro Roldán-Alzate.  
Role: Principal Investigator
2. NIH – NIDDK (Via Obrien Center at Pittsburg) (134789-2) 11/2020 – 11/2022 (\$222,277)  
Opportunity Pool application on benign urology.  
The overall goal of this proposal is to develop and validate a novel MRI strategy to quantitatively characterize changes in bladder anatomy and function in men with benign prostatic hyperplasia and lower urinary tract symptoms (BPH/LUTS).  
Role: Principal Investigator
3. NIH Diacomp Pilot & Feasibility (21AU4205). 9/2021 – 9/2022 (\$100,000)  
MRI Urodynamic Evaluation of Early Changes in Diabetic Cystopathy  
Role: Principal Investigator

4. NIH R01 (1 R01 EB030497-01). 08/2021 – 08/2024 (\$1,616,189/\$185,000)  
Develop motion-robust, reduced-distortion diffusion MRI methods appropriate for imaging the abdomen, and validate in patients with liver metastases.  
PI: Diego Hernando,  
Role: Co-Investigator
5. NIH R01 DK125783-01 04/01/2021 – 03/31/2025 (\$2,253,164/\$258,000)  
Development of 4D flow MRI for risk stratification of variceal bleeding in cirrhosis.  
The overall goal of this proposal is to develop and validate a non-invasive way of assessing the complex portal blood flow in patients with portal hypertension and cirrhosis. Particle image velocimetry and in vitro models will be used a part of the validation in the proposed study.  
PI: Reeder SB, Wieben O  
Role: Co Investigator
6. NIH R01 CA226297-01 (PI: Pamela K. Kreeger) 08/2020 – 07/2024 (\$2,400,000/\$194,215)  
The impact of alternatively-activated macrophages on tumor cell adhesion during transcoelomic spread in ovarian cancer.  
This project aims to study the role of peritoneal fluid flow on ovarian cancer metastasis using computational simulations  
Role: Co Investigator
7. AHA (19TPA34850066). 02/2020 – 02/2022 (\$250,000/\$58,000)  
Patient Specific 4D Flow Modeling for Improved Management of Aortic Coarctation Repair  
This project aims to evaluate the blood flow dynamics in patients with aortic coarctation using 4D Flow MRI and in vitro modeling. (\$58,000)  
Role: Principal Investigator (Alejandro Roldán-Alzate, (Multicenter grant from American Heart Association. Dr. Roldán-Alzate is the PI at UW – Madison and Michael Markl is the PI at Northwestern University)

## Completed

Title: Multidisciplinary K12 Urologic Research Career Development Program Dale Bjorling (PI)

Sponsor: NIH/NIDDK K12DK100022

Award: \$158,545

Award Dates 08/01/16-06/30/21 Role: Scholar

Title: Advanced MRI of Uteroplacental Flow, Perfusion, Oxygenation, and Inflammation Shah, Dinesh (Co-PI) and Wieben, Oliver (Co-PI)

Sponsor: NIH U01 Award: \$4,023,484

Award Dates: 09/17/15-08/31/21 Role: Co-Investigator

Title: Accelerated Nuero-MRA using compressed sensing and constrained reconstruction

Johnson, Kevin (Co-PI) and Turski, Patrick (Co-PI) Sponsor: NIH R01  
Award: \$1,392,303  
Award Dates: 08/01/15-05/31/21  
Role: Co-Investigator

Title: Functional and Molecular Diversity in the Tumor Microenvironment Underlies  
Therapeutic Response and Resistance  
Jarrard/Beebe/Lang (Co PIs) Sponsor: DOD  
Award: \$1,683,00  
Award Dates: 08/01/16-07/31/21 Role: Co-Investigator

Title: Comprehensive Non-invasive Assessment of Extracardiac Total Cavo-Pulmonary  
Connection using 4D Flow MRI  
Roldán-Alzate, Alejandro (PI)  
Sponsor: American Heart Association (Scientist Development Grant)  
Award: PRJ85VH \$306,125  
Award Dates: Jul 2014 - Jul 2018  
Role: Principal Investigator

Title: Quantitative Hemodynamics of the Liver with 4D Flow MRI  
Reeder, Scott (Co-P) and Wieben, Oliver (Co-PI)  
Sponsor: NIH/DHHS R01DK096169-01  
Award: PRJ66GE \$218,367  
Award Dates: April 2012 - April 2016  
Co-PIs: Scott Reeder and Oliver Wieben  
Role: Co-Investigator

Pending

R21 NS066982 (Roldan) 10/01/2019-10/01/2021 3.0 calendar  
NIH/NHLBI \$275,000  
Noninvasive Assessment of Changes in Bladder Anatomy and Function in Aging Women  
with Underactive Bladder.  
This project seeks to assess the age related changes in bladder anatomy and function by  
establishing MRI biomarkers.

R21 NS066982 (Johnson/Roldan) 10/01/2019-10/01/2021 3.0 calendar  
NIH/NHLBI \$275,000  
Quantitative Methods for Noninvasive Assessment of Brain Motion and Fluid Flow  
This project seeks to harness opportunities in MRI technology to dramatically improve the  
quantitative accuracy and comprehensiveness of brain biomechanical measures.

## Publications

### Journal articles

1. Pewowaruk R, Rutkowski D, Hernando D, Kumapayi BB, Bushman W, **Roldán-Alzate A**. A pilot study of bladder voiding with real-time MRI and computational fluid dynamics. *PLoS One*. 2020 Nov 19;15(11):e0238404. doi: 10.1371/journal.pone.0238404. PMID: 33211706.
2. Pewowaruk R, Hermsen J, Johnson C, Erdmann A, Pettit K, Aesif S, Ralphe JC, Francois CJ, **Roldán-Alzate A**, Lamers L. Pulmonary artery and lung parenchymal growth following early versus delayed stent interventions in a swine pulmonary artery stenosis model. *Catheter Cardiovasc Interv*. 2020 Oct 16. doi: 10.1002/ccd.29326. Epub ahead of print. PMID: 33063918.
3. Anzia LE, Johnson CJ, Mao L, Hernando D, Bushman WA, Wells SA, **Roldán-Alzate A**. Comprehensive non-invasive analysis of lower urinary tract anatomy using MRI. *Abdom Radiol (NY)*. 2020 Oct 11. doi: 10.1007/s00261-020-02808-9. Epub ahead of print. PMID: 33040167.
4. Pewowaruk R, Mendrisova K, Larrain C, Francois CJ, **Roldán-Alzate A**, Lamers L. Comparison of pulmonary artery dimensions in swine obtained from catheter angiography, multi-slice computed tomography, 3D-rotational angiography and phase-contrast magnetic resonance angiography. *Int J Cardiovasc Imaging*. 2020 Oct 9:1–11. doi: 10.1007/s10554-020-02043-9. Epub ahead of print. PMID: 33034866; PMCID: PMC7545377.
5. Pewowaruk RJ, Racine J, Iruretagoyena JJ, **Roldán-Alzate A**. Ultrasound Based Computational Fluid Dynamics Assessment of Brachial Artery Wall Shear Stress in Preeclamptic Pregnancy. *Cardiovasc Eng Technol*. 2020 Oct 6. doi: 10.1007/s13239-020-00488-6. Epub ahead of print. PMID: 33025370.
6. Schubert T, Rivera-Rivera L, **Roldan-Alzate A**, Consigny D, Leitner L, Strother C, Aagaard-Kienitz B. Achievable aspiration flow rates with large balloon guide catheters during carotid artery stenting. *CVIR Endovasc*. 2020 Sep 10;3(1):65. doi: 10.1186/s42155-020-00134-1. PMID: 32910271; PMCID: PMC7483693
7. Medero R, Ruedinger K, Rutkowski D, Johnson K, **Roldán-Alzate A**. In Vitro Assessment of Flow Variability in an Intracranial Aneurysm Model Using 4D Flow MRI and Tomographic PIV. *Ann Biomed Eng*. 2020 Oct;48(10):2484-2493. doi: 10.1007/s10439-020-02543-8. Epub 2020 Jun 10. PMID: 32524379
8. Hermsen JL, **Roldán-Alzate A**, Anagnostopoulos PV. Three-dimensional printing in congenital heart disease. *J Thorac Dis*. 2020 Mar;12(3):1194-1203. doi: 10.21037/jtd.2019.10.38. PMID: 32274200; PMCID: PMC7138972.
9. Rutkowski DR, Barton, GP, Aggarwal N, François CJ, **Roldán-Alzate A**. Sex Differences in Cardiac Flow Dynamics of Healthy Volunteers. *Radiology: Cardiothoracic Imaging* [Accepted for Publication]

10. Rutkowski DR, Medero R, Ruesink T, **Roldán-Alzate A**. Modeling Physiological Flow Variation in Fontan Models with 4d Flow Mri, Particle Image Velocimetry, and Arterial Spin Labeling. *J Biomech Eng*. 2019 Oct 1. doi: 10.1115/1.4045110. [Epub ahead of print] PubMed PMID: 31596919.
11. Rutkowski DR, Wells SA, Johnson B, Huang W, Jarrard DF, Lang JM, Cho S, **Roldán-Alzate A**. Mri-based cancer lesion analysis with 3d printed patient specific prostate cutting guides. *Am J Clin Exp Urol*. 2019 Aug 15;7(4):215-222. eCollection 2019. PubMed PMID: 31511828; PubMed Central PMCID: PMC6734042.
12. Liu TT, Thomas S, Mclean DT, **Roldán-Alzate A**, Hernando D, Ricke EA, Ricke WA. Prostate enlargement and altered urinary function are part of the aging process. *Aging (Albany NY)*. 2019 May 13;11(9):2653-2669. doi: 10.18632/aging.101938. PubMed PMID: 31085797; PubMed Central PMCID: PMC6535061.
13. Liu TT, Rodgers AC, Nicholson TM, Macoska JA, Marker PC, Vezina CM, Bjorling DE, **Roldán-Alzate A**, Hernando D, Lloyd GL, Hacker TA, Ricke WA. *Ultrasonography of the Adult Male Urinary Tract for Urinary Functional Testing*. *J Vis Exp*. 2019 Aug 14;(150). doi: 10.3791/59802. PubMed PMID: 31475976.
14. McLean DT, Rutkowski DR, Liu T, Hernando D, Ricke WA, **Roldán-Alzate A**. MRI-based method for lower urinary tract dysfunction in adult male mice. *Am J Clin Exp Urol* 2019;7(3):153-158 [www.ajceu.us](http://www.ajceu.us) /ISSN:2330-1910/AJCEU0097273
15. Pewaworuk R, **Roldán-Alzate A**. 4D Flow MRI Estimation of Boundary Conditions for Patient Specific Cardiovascular Simulation. *Annals of Biomedical Engineering*, Vol. 47, No. 8, August 2019 pp. 1786–1798 <https://doi.org/10.1007/s10439-019-02285-2>
16. Rutkowski DR, Barton G, François CJ, Bartlett HL, Anagnostopoulos PV, **Roldán-Alzate A**. Analysis of cavopulmonary and cardiac flow characteristics in fontan Patients: Comparison with healthy volunteers. *J Magn Reson Imaging*. 2019 Jan 11. doi: 10.1002/jmri.26583
17. Rutkowski DR, Garcia FJ, **Roldán-Alzate A**. MRI-based modeling of spleno-mesenteric confluence flow. *Journal of Biomechanics* 88 (2019) 95–103
18. Rutkowski DR, Sun D, Anderson PA, **Roldán-Alzate A**. A Method to Design and Manufacture Low Cost Patient Specific Templates for Spinal Surgery. *Journal of 3D Printing in Medicine*. <https://doi.org/10.2217/3dp-2018-0019> 2018
19. Motosugi U, **Roldán-Alzate A**, Bannas P, Said, A, Kelly S, Wieben, O, Reeder, SB. Utility of 4D flow MRI as a marker for risk stratification of gastroesophageal varices in patients with liver cirrhosis. *Radiology* <https://doi.org/10.1148/radiol.2018180230>
20. Ruedinger K, Zhou, H, Trampe, B, Heiser, T, Iruretagoyena, JI, **Roldán-Alzate, A**. Modeling Fetal Heart Hemodynamics from Prenatal Echocardiography with 4D Flow MRI. *Circulation: Cardiovascular Imaging*. 2018;11:e007705

21. Ruesink TA, Medero R, Rutkowski DR, **Roldan-Alzate A**. In-Vitro Validation of Regional 4D Flow MRI Pulse Wave Velocity. [Cardiovasc Eng Technol](#). 2018 Sep 14. doi: 10.1007/s13239-018-00377-z
22. Medero R, Holfman C, **Roldán-Alzate A**. Comparison of 4D Flow MRI and Particle Image Velocimetry Using an In Vitro Carotid Bifurcation Model. [Ann Biomed Eng](#). 2018 Aug 15. doi: 10.1007/s10439-018-02109-9.
23. Rutkowski D , Francois, CJ, **Roldán-Alzate, A**.Respiratory Variation in Ventricular Hemodynamics of Healthy Volunteers using 4D MRI. *Journal of Cardiac Magnetic Resonance* in Review.
24. Frydrychowicz A, **Roldan-Alzate A**, Winslow E, Consigny D, Campo CA, Motosugi U, Johnson KM, Wieben O, Reeder SB. Comparison of Radial 4D Flow-MRI with Perivascular Ultrasound to Quantify Blood Flow in the Abdomen and Introduction of a Porcine Model of Pre-hepatic Portal Hypertension. *European Radiology*, 2017; 27:12 Pages: 5316-5324. DOI: 0.1007/s00330-017-4862-4
25. Ruedinger K, Rutkowski D, Schafer S, **Roldan-Alzate A**, Oberstar E, Strother, C Impact of image reconstruction parameters when using 3D DSA reconstructions to measure intracranial aneurysms. *J NeuroIntervent Surg* doi:10.1136/neurintsurg-2017- 013080
26. Medero R, García-Rodríguez S, Anagnostopoulos PV, François CJ, **Roldán-Alzate A**. Patient-Specific in-Vitro Models for Hemodynamic Analysis of Congenital Heart Disease - Additive Manufacturing Approach. *Journal of Biomechanics* 10.1016/j.jbiomech.2017.01.048
27. Rutkowski D, Fernandez L, Reeder SB, **Roldan-Alzate A**. Comprehensive Hemodynamics of Living Donor Liver Transplant Using 4D Flow MRI and Computational Fluid Dynamics. *Computer Methods in Biomechanics and Biomedical Engineering*. <http://dx.doi.org/10.1080/21681163.2017.1278619>
28. Hussaini SF, Rutkowski DR, **Roldan-Alzate A**, Francois CJ. Left and Right Ventricular Kinetic Energy using Time-Resolved versus Time-Average Ventricular Volumes. *Journal of Magnetic Resonance Imaging*. 2016 Aug 9. doi: 10.1002/jmri.25416
29. Bannas P, **Roldan-Alzate A**, Johnson KM, Woods MA, Ozkan O, Motosugi U, Wieben O, Reeder SB, Kramer H. Longitudinal Monitoring of Hepatic Blood Flow before and after TIPS by Using 4D-Flow MR Imaging. *Radiology*. Epub ahead of print, PMID pending.
30. **Roldan-Alzate A**, Francois CJ, Wieben O, Reeder SB. Emerging Applications of Abdominal 4D Flow MRI. *Gastrointestinal Imaging • Review*. *AJR* 2016; 207:1–9. DOI:10.2214/AJR.15.15995.
31. Kellawan JM, Schrauben EM, Harrell JW, Hoffman CA, **Roldán-Alzate A**, Schrage WG and Wieben O. Simultaneous quantification of blood flow in major intracranial arteries during hypercapnia using 4D flow MRI. e-pub *AJNR*.

32. Bannas P, Hernando D, Motosugi U, **Roldán-Alzate A** and Reeder SB. Emerging quantitative MRI biomarkers of diffuse liver disease. *Clinical Liver Disease* December 2014, 4(6); 129-132.
33. **Roldán-Alzate A**, García-Rodríguez S, Anagnostopoulos PV, Srinivasan S, Wieben O, François CJ. Hemodynamic study of TCPC using in vivo and in vitro 4D Flow MRI and numerical simulation. *J Biomech*. 2015 May 1;48(7):1325-30. doi: 10.1016/j.jbiomech.2015.03.009. Epub 2015 Mar 19. PMID: 25841292. PMCID: PMC4406283.
34. Jeong D, **Roldán-Alzate A**, Srinivasan S, Anagnostopoulos PV, Schiebler ML, Wieben O, and Francois CJ. Ventricular kinetic energy in repaired Tetralogy of Fallot: a prospective cohort study assessed with 4D flow magnetic resonance imaging. *J Thorac Cardiovasc Surg* 2014 Dec 4 [Epub ahead of print]. PMCID: PMC Journal in Process].
35. Bellofiore A, Henningsen J, Lepak CG, Tian L, **Roldán-Alzate A**, Kelliham HB, Consigny DW, Francois CJ, Chesler NC. A Novel in Vivo Approach to Assess Radial and Axial Distensibility of Large and Intermediate Pulmonary Artery Branches. *Journal of Biomechanics*. In review
36. Tian L, Henningsen J, Bellofiore A, Forouzan O, Kelliham HB, **Roldán-Alzate A**, Consigny DW, Gunderson MC, Dailey SH, François CJ, Chesler NC. Pulmonary Artery Relative Area Change Is Inversely Related to Ex Vivo Measured Arterial Elastic Modulus in the Canine Model of Acute Pulmonary Embolization. *Journal of Biomechanics*. *Journal of Biomechanics*; 47(12) 2014.
37. **Roldán-Alzate A**, Frydrychowicz A, Said A, Johnson KM, Wieben O, Reeder SB. Portal Hypertension: Quantification of Changes in Hepatic Blood Flow with 4D Flow MRI After a Meal Challenge. *Journal of Magnetic Resonance Imaging*, E-pub
38. Alex J Barker, **Alejandro Roldán-Alzate**, Pegah Entezari, Sanjiv J. Shah, Naomi C Chesler, Oliver Wieben, Michael Markl, Christopher J François. 4D Flow Assessment of Pulmonary Artery Flow and Wall Shear Stress in Adult Pulmonary Arterial Hypertension: Results from Two Institutions. *Magnetic Resonance in Medicine*; doi: 10.1002/mrm.25326, 2014
39. Markovic LE, Kelliham HB, **Roldán-Alzate A**, Drees R, Bjorling DE, François CJ. Advanced Multimodality Imaging of An Anomalous Vessel Between the Ascending Aorta and Main Pulmonary Artery in a Dog. *Journal of Veterinary Cardiology*; 16, 59- 65, 2014.
40. Swift AJ, Wild JM, Nagle SK, **Roldán-Alzate A**, François CJ, Fain S, Johnson KM, Jarjour N, van Beek E, Wang K, Schiebler M. Quantitative MR Imaging of Pulmonary Arterial Hypertension: A Practical Approach to the Current State of the Art. *Journal of Thoracic Imaging*; 29(2): 68–79, 2014
41. **Roldán-Alzate A**, Frydrychowicz A, Johnson KM, Kelliham H, Chesler N, Wieben O, François CJ. Non-Invasive Assessment of Cardiac Function and Pulmonary Vascular Resistance in a Canine Model of Acute Thromboembolic Pulmonary Hypertension Using



4D Flow MRI. *Journal of Cardiac Magnetic Resonance*; 16:23, 2014.

42. Foruzan O, Flink E, Thate N, Haske A, Tongkeum L, **Roldán-Alzate A**, François CJ, Wieben O and Chesler N. Low Cost MRI-Compatible Stepper Exercise Device for Use in Cardiac Stress Tests. *ASME – Journal of Medical Devices*. In Press, early view online available 2014
43. Schiebler ML, Bhalla S, Runo J, Jarjour N, **Roldán-Alzate A**, Chesler N, François CJ. Magnetic Resonance and Computed Tomography Imaging of the Structural and Functional Changes of Pulmonary Arterial Hypertension. *Journal of Thoracic Imaging*; 28:178–195, 2013.
44. Landgraf BR, **Roldán-Alzate A**, Johnson KM, François CJ, Wieben O, Reeder SB. Effect of Temporal Resolution on 4D Flow MRI in the Portal Circulation. *Journal of Magnetic Resonance Imaging*; 39(4): 819-826 2013.
45. **Roldán-Alzate A**, Frydrychowicz A, Niespodzany E, Landgraf BR, Wieben O, Johnson KM, Reeder SB. In vivo Validation of 4D Flow MRI for Assessing the Hemodynamics of Portal Hypertension. *Journal of Magnetic Resonance Imaging*; 37(5):1100-8, 2013.
46. Bellofiore A, **Roldán-Alzate A**, Besse M, Kelliham HB, Consigny DW, François CJ, Chesler NC. Impact of Acute Pulmonary Embolization on Arterial Stiffening and Right Ventricular Function in Dogs. *Annals of Biomedical Engineering*; 41(1):195-204, 2013.
47. Artz NS, Hines CDG, Brunner S, Agni R, Kuhn J-P, **Roldán-Alzate A**, Chen G-H, Reeder SB. Quantification of Hepatic Steatosis with Dual-Energy CT: Comparison with Tissue Reference Standards and Quantitative MRI in the ob/ob Mouse. *Investigative Radiology*; 47(10):603-10, 2012.
48. Tabima DM, **Roldán-Alzate A**, Wang Z, Hacker TA, Molthen RC, Chesler NC. Persistent Vascular Collagen Accumulation Alters Hemodynamic Recovery from Chronic Hypoxia. *Journal of Biomechanics*; 45(5):799–804, 2012.
49. Frydrychowicz A, Landgraf BR, Niespodzany E, Verma RW, **Roldán-Alzate A**, Johnson KM, Wieben O, Reeder SB. 4D Velocity Mapping of the Hepatic and Splanchnic Vasculature with Radial Sampling at 3T: A Feasibility Study in Portal Hypertension. *Journal of Magnetic Resonance Imaging*; 34(3):577–584, 2011.
50. Chesler NC, **Roldán A**, Vanderpool RR, Naeije R. How to Measure Pulmonary Vascular and Right Ventricular Function, *IEEE Engineering in Medicine and Biology Society*; 1:177-180, 2009.
51. **Roldán A**, Weiben O, Haughton V, Chesler N, Osswald T. Characterization of CSF Hydrodynamics in the Presence and Absence of Tonsillar Ectopia by Means of Computational Flow Analysis (CFA). *American Journal of Neuroradiology*; 30:941-946, 2009.
52. García S, **Roldán A**, Osswald T. Thin-Wall Injection Molding – A Dimensional

Analysis and Scaling Analysis Approach. J of Plastics Technology; 4(5), 2008.

53. Bustamante J, Barros JF, **Roldán A**, García S. Modelo Físico del Sistema Cardiovascular – DYNASYM. Revista Colombiana de Cardiología; 11(3):150-156, 2003.

### Peer reviewed conference papers

### Scientific Oral Presentations

1. Rutkowski DR, François, C. J, Wieben O, **Roldán-Alzate, A** Respiratory changes in pulmonary flow distribution in fontan circulation: A comparison between “5-D” MRI and CFD Simulation. Summer Biomechanics, Bioengineering and Biotransport Conference (SB<sup>3</sup>C2017) June 21 – 24, Tucson, AZ.
2. Garcia-Rodriguez S, Medero R, Francois CJ, **Roldán-Alzate A** Computational Fluid Dynamics of Aortic Dissection: 4D Flow MRI-Based Inlet Boundary Conditions. Summer Biomechanics, Bioengineering and Biotransport Conference (SB<sup>3</sup>C2017) June 21 – 24, Tucson, AZ.
3. Rutkowski D, Fernandez L, Reeder SB, **Roldan-Alzate A**. Patient Specific Virtual Surgery for Living Donor Liver Transplant: Right vs. Left Lobectomy. ISMRM – Flow and Motion Workshop 2016. San Francisco, CA, Oct 20 - 23.
4. Rutkowski D, Fernandez L, Reeder SB, **Roldan-Alzate A**. Patient Specific Virtual Surgery Models Using Meal Challenge Vessel Strain Values. Society of Magnetic Resonance Angiography (SMRA2016) Chicago, IL, Sept 21- 23.
5. Medero R, Rutkowski D, Weathers M, Johnson K, **Roldan-Alzate A**. Comparison of In Vitro 4D Flow MRI and CFD to Stereoscopic Particle Image Velocimetry. Society of Magnetic Resonance Angiography (SMRA2016) Chicago, IL, Sept 21- 23.
6. Rutkowski D, Fernandez L, Reeder SB, **Roldan-Alzate A**. Patient Specific Virtual Surgery for Living Donor Liver Transplant: Right vs. Left Lobectomy. Flow and Motion Workshop – ISMRM
7. Borden Z, **Roldan-Alzate A**, Francois CJ. In vitro validation of Cartesian 4D flow mapping using patient-specific 3D printed total cavo-pulmonary connection models. International Society for Magnetic Resonance in Medicine Annual Meeting 2016. Singapore, Asia. May 7, 2016.
8. Garcia-Rodriguez S, **Roldan-Alzate A**, Reeder SB, Wieben O, Francois CJ. Diurnal Variation of Renal Blood Flow using 4D flow MRI. International Society for Magnetic Resonance in Medicine Annual Meeting 2016. Singapore, Asia. May 7, 2016.
9. **Roldan-Alzate A**, Garcia-Rodriguez S, Francois CJ. Comprehensive Analysis of Total Cavo-Pulmonary Connection Hemodynamics With in Vivo And in Vitro 4d Flow MRI and Computational Fluid Dynamics. 8th International Biofluid Symposium to be held in

Caltech, Pasadena, February 12-14, 2016.

10. **Roldán-Alzate A**, Fernandez L, Reeder SB. Hemodynamic Changes in the Portal Circulation in Living Related Liver Donors Assessed by 4D flow MRI. International Society for Magnetic Resonance in Medicine Annual Meeting 2016. Singapore, Asia. May 7, 2016.
11. **Roldán-Alzate A**, Said A, Campo C, Johnson KM, Francois, CJ. Wieben O, and Reeder SB. Non-Invasive Characterization and Staging of Portal Hypertension using 4D Flow MRI. ISMRM 23<sup>rd</sup> Annual Meeting & Exhibition; Toronto, Canada, 2015.
12. **Roldán-Alzate A**, Campo C, Johnson KM, Wieben O, and Reeder SB. Diurnal Variation of Portal Hemodynamics with 4D flow MRI. ISMRM 22<sup>nd</sup> Annual Meeting & Exhibition; Milan, Italy, 2014.
13. **Roldán-Alzate A**, Campo C, Johnson KM, Wieben O, and Reeder SB. Repeatability of 4D flow MRI Quantification of Venous and Arterial flow in the Abdomen. ISMRM 22<sup>nd</sup> Annual Meeting & Exhibition; Milan, Italy, 2014.
14. **Roldán-Alzate A**, Frydrychowicz A, Wieben O, Reeder SB. Quantification of Hepatic Blood Flow in Portal Hypertension Using 4D-Flow MRI: A Meal Challenge Study. ISMRM 21<sup>st</sup> Annual Meeting & Exhibition; Salt Lake City, UT, USA, 2013.
15. **Roldán-Alzate A**, Muñoz del Río A, Agni R, Said A, Wieben O, Reeder SB. Comprehensive Assessment of Diffuse Liver Disease with Quantitative MRI Biomarkers of Steatosis, Fibrosis and Portal Flow: A Biopsy Correlation Study. ISMRM 21<sup>st</sup> Annual Meeting & Exhibition; Salt Lake City, UT, USA, 2013.
16. **Roldán-Alzate A**, Frydrychowicz A, Reeder SB, Wieben O. Quantification of Blood Flow in the Portal Circulation Before and After and Intervention. SCMR-ISMIRM Workshop: Exploring New Dimensions of Cardiovascular Flow and Motion; Orlando, FL, USA, 2012.
17. **Roldán-Alzate A**, François CJ, Niespodzany E, Kelliham H, Chesler NC, Frydrychowicz A, Wieben O, Johnson KM. Assessment of Right Ventricular and Pulmonary Hemodynamics in Pulmonary Artery Hypertension. MRA 23<sup>rd</sup> Annual International Conference; Banff, Canada, 2011.
18. **Roldán-Alzate A**, Frydrychowicz A, Wieben O, Reeder SB. Comprehensive Anatomic and Hemodynamic Evaluation of Portal Hypertension with 4D Flow Phase Contrast MRI. SCBT-MR Annual Meeting; Washington D.C., MD, USA, 2011.
19. **Roldán-Alzate A**, Niespodzany E, Kelliham H, Chesler NC, Frydrychowicz A, Wieben O, Johnson KM, Reeder SB, CJ François. Assessment of Right Heart Flow Patterns and Main Pulmonary Artery Hemodynamics in Pulmonary Artery Hypertension Using 4D PC MRI. SCBT-MR Annual Meeting; Washington D.C., MD, USA, 2011.
20. **Roldán-Alzate A**, Frydrychowicz A, Niespodzany E, Landgraf BR, Wieben O, Reeder SB. 4D MR Velocity Mapping Using PC VIPR to Measure Blood Flow In Portal Hypertension. ISMRM 19<sup>th</sup> Annual Meeting & Exhibition; Montréal, Canada, 2011.

21. **Roldán-Alzate A.**, Vanderpool RR, Chesler, NC. The Effects of Pulmonary Vascular Collagen Accumulation on Right Ventricular Afterload Investigated Using a Genetically Engineered Mouse Model. ATS International Conference, New Orleans, LA, USA, 2010.
22. **Roldán A**, Haughton V, Osswald TA, Chesler N. Computational Analysis of Cerebrospinal Fluid Flow in the Normal and Obstructed Subarachnoid Space. ASME Summer Bioengineering Conference; Marco Island, FL, USA, 2008.
23. **Roldán A**, Haughton V, Osswald TA, Chesler, N. Cause of Hyperkinetic CSF Flow in Chiari I Malformation: Effect of Subarachnoid Space Dimensions on CSF Flow through the Foramen Magnum. ASNR 46th Annual Meeting & NER Foundation Symposium; New Orleans, LA, USA, 2008.
24. **Roldán A**, Wentland A, Weiben O, Haughton V, Osswald TA. Cerebrospinal Fluid Flow in the Chiari I Malformation Modeled with Computational Flow Dynamics. ASNR 45th Annual Meeting; Chicago, IL, USA, 2007.

#### Other

25. Garcia-Rodriguez S, Leschke, J, Francois CJ, **Roldan-Alzate A.**, Computational Fluid Dynamics of Pulmonary Circulation Before and After Induced Pulmonary Hypertension: 2D Flow and 4D Flow MRI-Based Boundary Conditions ISMRM 25th Annual Meeting and Exhibition, Honolulu, HI. (E-Poster)
26. Medero R, **Roldán-Alzate A.** Comparison of 4D Flow MRI and Tomographic Particle Image Velocimetry. ISMRM 25th Annual Meeting and Exhibition, Honolulu, HI. (E-Poster)
27. Rutkowski DR, François, C. J, **Roldán-Alzate, A.** Respiratory changes in pulmonary flow distribution in Fontan circulation using "5-D" flow MRI. ISMRM 25th Annual Meeting and Exhibition, Honolulu, HI. (E-Poster)
28. Rutkowski DR, Reeder SB., **Roldán-Alzate, A.** Comprehensive Hemodynamics of Living Donor Liver Transplantation Using MRI-based In-Vitro Experiments and Computational Simulation. ISMRM 25th Annual Meeting and Exhibition, Honolulu, HI. (Poster)
29. Medero R, **Roldán-Alzate A.** In Vitro Comparison of 4D Flow MRI to Stereo Particle Image Velocimetry. Society for Magnetic Resonance Angiography 28<sup>th</sup> Annual Conference. Chicago IL, Sept 21<sup>st</sup> – 23<sup>rd</sup> (Poster)
30. Medero R, García-Rodríguez S, Anagnostopoulos PV, François CJ, **Roldán-Alzate A.** In Vitro Comparison of 4D Flow MRI to Stereo Particle Image Velocimetry. Society for Magnetic Resonance Angiography 28<sup>th</sup> Annual Conference. Chicago IL, Sept 21<sup>st</sup> – 23<sup>rd</sup> (Poster)
31. **Roldan-Alzate A**, Schrauben E, Wieben O, and Francois CJ. Kinetic Energy Distributions in Fontan Circulation - Evaluation of Respiration Effects. International Society for Magnetic Resonance in Medicine Annual Meeting 2016. Singapore, Asia.

May 7, 2016. (Poster).

32. Garcia-Rodriguez S, Wrobel J, Francois CJ, **Roldan-Alzate A**. 4D Flow MRI Improves Computational Fluid Dynamics Analysis of Aortic Dissection. International Society for Magnetic Resonance in Medicine Annual Meeting 2016. Singapore, Asia. May 7, 2016.
33. Francois CJ, Borden Z, Garcia-Rodriguez S, Wrobel J, **Roldan-Alzate A**, Effects of 3D-printing technology on flow measurements in patient-specific models of total cavo-pulmonary connection. International Society for Magnetic Resonance in Medicine Annual Meeting 2016. Singapore, Asia. May 7, 2016.
34. Medero R, García-Rodríguez S, Anagnostopoulos PV, François CJ, **Roldán-Alzate A**. Patient-Specific in-Vitro Models for Hemodynamic Analysis of Congenital Heart Disease - Additive Manufacturing Approach. Summer Biomechanics, Bioengineering and Biotransport Conference (SB<sup>3</sup>C2016) National Harbor, MD, June 29-July 2<sup>nd</sup>.
35. Rutkowski D, Fernandez L, Reeder SB, **Roldan-Alzate A**. Comprehensive Hemodynamics of Living Donor Liver Transplant. Summer Biomechanics, Bioengineering and Biotransport Conference (SB<sup>3</sup>C2016) National Harbor, MD, June 29-July 2<sup>nd</sup>.
36. Shrauben EM, Francois, CJ, Wieben O **Roldán-Alzate A**. 4D flow MRI of the Great Vessels during Respiration Plateaus. ISMRM 23<sup>rd</sup> Annual Meeting & Exhibition; Toronto, Canada, 2015.
37. **Roldán-Alzate A**, Weins CN, Johnson KM, Mcmillan AB, Wieben O, Sirlin C, and Reeder SB. Quantification of Hepatic Blood Flow in Obese Patients using 4D-flow MRI. ISMRM 23<sup>rd</sup> Annual Meeting & Exhibition; Toronto, Canada, 2015.
38. **Roldán-Alzate A**, García-Rodriguez S, Steffens TG, Johnson KM, Wieben O, Anagnostopoulos PV, and CJ François. Comprehensive Analysis of Total Cavo-Pulmonary Connection Hemodynamics with In Vivo and In Vitro 4D Flow MRI and Computational Fluid Dynamics. ISMRM 22<sup>nd</sup> Annual Meeting & Exhibition; Milan, Italy, 2014.
39. **Roldán-Alzate A**, García-Rodriguez S, Rivera L, Wieben O, Anagnostopoulos PV, and CJ François. Hemodynamic Study of TCPC Using In Vivo and In Vitro 4D Flow MRI and Numerical Simulation. SCMR 17<sup>th</sup> Annual Scientific Sessions; New Orleans, LO, USA, 2014.
40. Wieben O, **Roldán-Alzate A**, Reeder SB, Schiebler ML, Nagle SK, Aecher CW, Landgraf BR, François CJ. 4D Flow MRI for Non-Invasive Assessment of Mesenteric Ischemia. ISMRM 21<sup>st</sup> Annual Meeting & Exhibition; Salt Lake City, UT, USA, 2013.
41. Bellofiore A, **Roldán-Alzate A**, Reeder SB, Runo J, Keevil JG, François CJ, Chesler NC. Non-Invasive Metrics of Right Ventricular Function in Pulmonary Hypertension. Poster presentation, ATS International Conference, Philadelphia, PA, USA, 2013.
42. Nett E, Rivera L, García-Rodríguez S, **Roldán-Alzate A**, Wieben O, Johnson K. Pressure

- Difference Measurements in Stenotic Flow Phantom: Comparison of 4D Flow MRI, Computational Fluid Dynamics, and Pressure Wire Measurements. ISMRM 21<sup>st</sup> Annual Meeting & Exhibition; Salt Lake City, UT, USA, 2013.
43. **Roldán-Alzate A**, Kilgas PC, Johnson KM, Wieben O, François CJ. Analysis of Right Ventricular Kinetic Energy in an Acute PAH Animal Model Using 4D Flow MRI. ISMRM 21<sup>st</sup> Annual Meeting & Exhibition; Salt Lake City, UT, USA, 2013.
  44. François CJ, **Roldán-Alzate A**, Wentland AL, Kelliham HB, Chesler NC, Wieben O. 4D Flow-Sensitive MRI Pulmonary Artery Pulse Wave Velocity in Pulmonary Arterial Hypertension. ISMRM 21<sup>st</sup> Annual Meeting & Exhibition; Salt Lake City, UT, USA, 2013.
  45. **Roldán-Alzate A**, Frydrychowicz A, Chesler NC, Wieben O, François CJ. 4D Flow-Sensitive MR Estimation of Pulmonary Vascular Resistance. SCMR 16<sup>th</sup> Annual Scientific Sessions; San Francisco, CA, USA, 2013.
  46. Bellofiore A, Besse M, **Roldán-Alzate A**, Kelliham HB, Consigny DW, François CJ, Nagle SK, Chesler NC. Impact of Acute Pulmonary Artery Stiffening on Right Ventricular Function in a Canine Model. ATS International Conference; San Francisco, CA, USA, 2012.
  47. Lepak CG, Bellofiore A, **Roldán-Alzate A**, Kelliham HB, Consigny DW, François CJ, Chesler NC. Distribution of Radial and Axial Distensibility in Canine Pulmonary Vasculature. Aspen Lung Conference 56<sup>th</sup> Annual Meeting; Aspen, CO, USA, 2012.
  48. Bellofiore A, **Roldán-Alzate A**, Besse M, Kelliham HB, Consigny DW, François CJ, Chesler NC. Right Ventricular Response to Pulmonary Arterial Stiffening in a Canine Model of Acute Embolization. Podium presentation, ASME Summer Bioengineering Conference; Fajardo, Puerto Rico, 2012.
  49. **Roldán-Alzate A**, Wieben O, Frydrychowicz A, Chesler NC, François CJ. Pulmonary Arterial Distensibility – 2D Phase Contrast vs 2D bSSFP. SCMR 15<sup>th</sup> Annual Scientific Sessions; Orlando, FL, USA, 2012.
  50. Frydrychowicz A, Reeder SB, **Roldán-Alzate A**, Consigny D, Johnson KM, Wieben O. Radial 4D Flow MRI for Quantification of Hepatic Blood Flow in Portal Hypertension. MRA 23<sup>rd</sup> Annual International Conference; Banff, Canada, 2011.
  51. Frydrychowicz A, Winslow E, Consigny D, Niespodzany E, Bultman E, **Roldán-Alzate A**, Johnson KM, Wieben O, Reeder SB. In-vivo Validation of 5-Point PC-VIPR for Hemodynamic Assessment of the Hepatic and Splanchnic Hemodynamics in Swine. ISMRM 19<sup>th</sup> Annual Meeting & Exhibition; Montréal, Canada, 2011.
  52. Frydrychowicz A, **Roldán-Alzate A**, Landgraf BR, Niespodzany E, Verma RW, Wieben O, Reeder SB. Analysis of Radially Undersampled 4D Velocity Mapping (PC VIPR) for Comprehensive Imaging in Portal Hypertension. ISMRM 19<sup>th</sup> Annual Meeting & Exhibition; Montréal, Canada, 2011.

53. François CJ, **Roldán-Alzate A**, Niespodzany E, Chesler NC, Frydrychowicz AP. Abnormal Right Heart Flow Patterns in Pulmonary Artery Hypertension Visualized with 4D Flow-Sensitive MRI. ISMRM 19<sup>th</sup> Annual Meeting & Exhibition; Montréal, Canada, 2011.
54. **Roldán-Alzate A**, Niespodzany E, Frydrychowicz AP, Consigny D, Chesler NC, François CJ. 4D PC MRI to Investigate the Hemodynamics of Acute Thromboembolic Pulmonary Hypertension in a Dog Model. ISMRM 19<sup>th</sup> Annual Meeting & Exhibition; Montréal, Canada, 2011.
55. **Roldán-Alzate A**, Kelliham H, Frydrychowicz A, Consigny DW, François CJ, Chesler NC. Acute Thromboembolic Pulmonary Hypertension in a Dog Model – Correlation of Right Ventricular Ejection Fraction and Pulmonary Arterial Distensibility Measured by MRI. ATS International Conference; Denver, CO, USA, 2011.
56. **Roldán-Alzate A**, Reeder SB, Keevil JG, Runo JR, Chesler NC. Low MPA Relative Cross Sectional Area Change Correlates with Decreased RV Function. ATS International Conference; New Orleans, LA, USA, 2010.
57. **Roldán-Alzate A**, Reeder SB, Keevil JG, Runo JR, Chesler NC. Low Relative Area Change of Main PA Correlates with High PA Pressure in Patients with Pulmonary Arterial Hypertension. Pittsburgh International Lung Conference; Pittsburgh, PA, USA, 2009.
58. Molthen R, Baumgart S, **Roldán A**, Vanderpool RR, Chesler NC. The Role of the Type I Procollagen Gene (Col1a1) and Oxidative Stress on the Pulmonary Circulation. BMES Conference; Pittsburgh, PA, USA, 2009.
59. Moses L, Baumgart S, **Roldán A**, Vanderpool RR, Molthen R, Chesler NC. The Role of Collagen in Hypertension Induced Stiffness of Pulmonary Arteries. BMES Conference; Pittsburgh, PA, USA, 2009.
60. **Roldán-Alzate A**, Reeder SB, Keevil JG, Runo JR, Chesler NC. Magnetic Resonance Imaging Provides Non-Invasive Assessment of Pulmonary Hypertension Severity by Low Relative Area Change of the Pulmonary Artery. ISMRM 17<sup>th</sup> Annual Meeting & Exhibition; Honolulu, HI, USA, 2009.
61. **Roldán A**, Runo J, Osswald TA, Keevil J, Reeder S, Chesler N. Relative Area Change of Main Pulmonary Artery Correlates with Mean Pulmonary Pressure. European Congress of Radiology; Vienna, Austria, 2009.
62. **Roldán A**, Sweitzer NK, Osswald TA, Chesler NC. Fluid Structure Interaction Analysis of Blood Flow Through Mechanical Heart Valves. ASME Summer Bioengineering Conference; Marco Island, FL, USA, 2008.
63. **Roldán A**, Haughton V, Osswald TA, Chesler N. Cerebrospinal Fluid Flow in the Chiari I Malformation – Computational Approach Using MR-Based Geometries. Sixth International Bio-Fluid Mechanics Symposium and Workshop; Pasadena, CA, USA, 2008.
64. **Roldán A**, Osswald TA, Haughton V. CSF Flow in the Chiari I Malformation Modeled with Computational Fluid Dynamics. Syringomyelia 2007; Rugby, England, 2007.

65. **Roldán A**, Sweitzer NK, Osswald TA, Chesler NC. Numerical Simulation of Blood Flow through Mechanical Heart Valves Using Meshless Techniques. ASME Summer Bioengineering Conference; Keystone, CO, USA, 2007.
66. **Roldán A**, Wentland A, Weiben O, Haughton V, Osswald TA, Chesler NC. CFD Modeling for Patient-Specific Analysis of Cerebrospinal Fluid Flow. ASME Summer Bioengineering Conference; Keystone, CO, USA, 2007.
67. **Roldán A**, Wentland A, Weiben O, Block WF, Klaers JL, Haughton V, Osswald TA. Numerical Modeling of CSF Flow in Patient - Specific Anatomical Models. Joint Annual Meeting ISMRM-ESMRMB; Berlin, Germany, 2007.
68. Farhoud M, Wentland AL, Wieben O, Klaers JL, Block WF, Jung Y, **Roldán A**, Haughton VM. Physical Models of Cerebrospinal Fluid Flow in Patients with Chiari I Malformation. Joint Annual Meeting ISMRM-ESMRMB; Berlin, Germany, 2007.
69. **Roldán A**, Chesler NC, Osswald TA. Residence Time Distribution Analysis in Prosthetic Heart Valves Using the Boundary Elements Method. BMES Annual Fall Meeting; Chicago, IL, USA, 2006.
70. **Roldán A**, Chesler NC, Bustamante J, Osswald TA. Simulation of Blood Flow and Deformations of Mechanical Heart Valves Using Boundary Integral Techniques. XXth Congress of the ISB and 29<sup>th</sup> Annual Meeting of the ASB; Cleveland, OH, USA, 2005.
71. García S, **Roldán A**, Hernández JP, Osswald TA. Dimensional Analysis and Scaling Approach for Thin-Wall Injection Molding. ANTEC 2004; Chicago, IL, USA, 2004.

## Invited Talks

1. Non-invasive patient-specific cardiovascular fluid dynamics. Applied and Computational Mathematics Seminar. Madison, WI. February 19, 2016.
2. Clinical Applications of 2D & 4D Flow. Cardiovascular MRI: Vascular Flow & Angiography Course at ISMRM 2016. Singapore, Asia, May 7<sup>th</sup>, 2016.
3. 2D/4D Flow Quantification. Cardiovascular Image Processing Course at ISMRM 2016. Singapore, Asia, May 11<sup>th</sup>, 2016.
4. Non-Invasive Patient-specific Cardiovascular Fluid Dynamic – Radiology Forum University of Yamanashi. Yamanashi, Japan, May 16<sup>th</sup>, 2016
5. Hemodynamics of Total Cavo-Pulmonary Connection in vivo and in vitro 4d Flow MRI and Computational Fluid Dynamics, 5th International Symposium on Engineering Frontiers in Congenital Heart Disease. Orlando, FL, June 10<sup>th</sup>, 2016.



6. Hepatic and Portal Venous MRA & Flow. 28th Society for Magnetic Resonance Angiography (SMRA) meeting. Chicago, IL, September 20th, 2016.
7. Biomecánica: Ingeniería e Innovación al servicio de la salud. Simposio internacional de Ingeniería. Universidad del Sinu Monteria, Cordoba, Colombia. Apr. 10, 2014
8. Humanismo y Biomecánica - Calidad de Vida del Paciente. *I Congreso Internacional de Humanismo y Nuevas Tecnologías*. Universidad Católica de Oriente, Rionegro, Antioquia, Colombia. Oct. 18, 2013
9. Segmentation and Corrections. *2<sup>nd</sup> CMR 4D Flow Workshop*. University of Oxford, Oxford, UK. Sept. 23, 2013
10. Análisis No-Invasivo de Enfermedades Cardiovasculares Mediante Imágenes de Resonancia Magnética 4D – Flow. *IV Seminario Internacional de Actualización Biomédica*. Universidad Autónoma de Occidente, Cali, Valle, Colombia. Sept. 6, 2013
11. Numerical Simulation of Physiological flows. *The Mohs Lectures by Placon – Rheology Research Center*. University of Wisconsin – Madison. Feb. 27, 2009
12. Numerical Simulation of Physiological flows. *The Lindbergh Lecture Series*. University of Wisconsin – Madison. Nov 13, 2008

## Other publications

1. Feiler D, Roldán A, Osswald TA. From Natural Rubber to Synthetic Rubber - the Road from the Amazon to Auschwitz. Educational Podcast, University of Wisconsin – Madison, 2007.

## Books and Book Chapters

1. Roldán-Alzate A, Chesler NC. Pulmonary Vascular Mechanics. In: Yuan, Garcia, Hales, Rich, Archer and West eds. Textbook of Pulmonary Vascular Disease, Springer- Verlag, New York, NY 2010.
2. Naranjo A, Noriega M, Sierra JD, Roldán A, Osswald TA. Testing and Characterization of Plastics - Industrial Applications. Hanser Publishers, 2008.

## Research Experience

<b>Assistant Professor</b> Departments of Mechanical Engineering and Radiology University of Wisconsin – Madison	8/2015
<b>Cardiovascular Modeling Scientist</b> Department of Radiology, University of Wisconsin – Madison	9/2010 – 8/2015
<b>Research Associate</b> Vascular Tissue Biomechanics Laboratory Department of Biomedical Engineering, University of Wisconsin - Madison	8/2008 - 8/2010
<b>Research Assistant</b> Polymer Engineering Center Department of Mechanical Engineering, University of Wisconsin - Madison	8/2003 - 8/2008
<b>Research Assistant</b> Laboratorio de Hidráulica Escuela de Ingeniería de Antioquia – Universidad CES Medellín, Colombia	1/2003 - 5/2003

## Teaching Experience

- Instructor, Fluid Mechanics ME363  
University of Wisconsin – Madison  
Department of Mechanical Engineering  
Fall 2015
- Guest Lecturer, Non-Invasive Assessment of Hemodynamics in  
Cardiovascular Diseases  
Introduction to Human Biomechanics Course  
Biological Sciences Department, Edgewood College  
Madison, Wisconsin, USA  
12/2013
- Visiting Professor  
Instituto de Alta Tecnología Médica de Antioquia  
Medellín, Antioquia, Colombia  
9/2012
- Instructor, Material Science of Polymers for Engineers  
Universidad Autónoma del Norte  
Barranquilla, Atlántico, Colombia  
7/2012
- Instructor, Material Science of Polymers for Engineers  
Universidad Nacional de Colombia  
Palmira, Valle del Cauca, Colombia  
7/2012
- Instructor, Biomechanics of Fluids and Solids – International Engineering  
Seminar  
Universidad Nacional de Colombia  
7/2011

Bogotá, Cundinamarca, Colombia

- Guest Lecturer, Biofluids Symposium 8/2010  
Escuela de Ingeniería de Antioquia  
Envigado, Antioquia, Colombia
- Instructor, Biomechanics of Fluids and Solids – International Engineering Seminar 7/2010  
Universidad Nacional de Colombia  
Medellín, Antioquia, Colombia
- Instructor, Material Science of Polymers for Engineers – IV International Engineering Seminar 6/2010  
Universidad Nacional de Colombia  
Leticia, Amazonas, Colombia
- Instructor, Polymers 101 5/2007  
Resilient Technology  
Wausau, WI, USA
- Guest Lecturer, Computational Fluid Dynamics for Physiological Flows 4/2007  
Biofluidics Course  
Department of Biomedical Engineering, University of Wisconsin - Madison
- Guest Lecturer, Polymer Testing 4/2006, 4/2007, 4/2008  
Engineering Design with Polymers Course  
Department of Mechanical Engineering, University of Wisconsin - Madison
- Instructor Summers 2004, 2005  
Plastics Summer Camp  
University of Wisconsin - Madison
- Teaching assistant 2004-2006  
Manufacturing Processes Course  
Department of Mechanical Engineering, University of Wisconsin - Madison

## **Mentoring**

- David Rutkowski, Graduate Student Mechanical Engineering August 2015 – Present
- Rafael Medero, Graduate Student Mechanical Engineering August 2015 – Present
- Benjamin Ratliff, Undergraduate Research Assistant (BME) May 2015 - Present
- Neil Doll, Graduate Student Mechanical Engineering June 2014 – present

- Matthew Smith, Shapiro Fellow Summer 2014
- Scott Grogan, Shapiro Fellow Summer 2014
- Syed Hussaini, Shapiro Fellow Summer 2014
- Phillip Kilgas, Research Assistant 2012 – present
- Camilo Campo, Undergraduate Scholar URS 2013 – present
- Daniel Gutiérrez Barragán, Undergraduate Research Assistant 2010
- Somana Dharam, Undergraduate Scholar URS 2010
- Lindsey Moses, Undergraduate Research Assistant 2009

## Other Professional Activities

- Reviewer of grant proposals for the Colombian national science foundation (Colciencias)
- **Journal reviews:**

ASME Journal of Biomechanical Engineering	2012 - present
IEEE Transactions to Medical Imaging	2013 - present
Revista Ingeniería Biomédica	2010 – present
American Journal of Neuroradiology	2015 – present
Int. J. of Computer Assisted Radiology and Surgery	2014 – present

## Computer & Laboratory Skills

### *Software*

- Windows Office, LaTeX, Adobe Illustrator
- Medical Images: Mimics, ImageJ, Ensignt, OsiriX
- CAD: SolidWorks, Geomagic
- Programing: Fortran, Matlab
- Data acquisition: LabVIEW
- FEM analysis: Ansys, Abaqus
- CFD analysis: Fluent, Comsol

### *Laboratory*

- Mechanical testing
- Data acquisition
- Polymer processing
- Biomethodology of the Lab Mouse
- Isolated lung surgical procedure
- Magnetic resonance, ultrasound and computed tomography image processing

### *Languages*

- Spanish (native language)
- English (fluent)

## Associations

American Thoracic Society	2010 – present
International Society of Magnetic Resonance in Medicine	2007 – present
Society of Computed Body Tomography and Magnetic Resonance	2011 – present

Society of Cardiovascular Magnetic Resonance

2011 – present